DRAFT 01/15/02

GNOME Input File Formats

Maps, BNA Format

The only map file currently used in GNOME is called "BNA". This consists of a list of lines and polygons that are to be drawn on the screen. Each feature is preceded by a description line, such as
"2","1",18
in the file below, called "Simple.bna".

- The first number in quotes represents an identifier for the feature, and is usually unique.
- The second number in quotes identifies the type of feature, "1" is a land feature and "2" is a water feature or a polygon within another larger polygon.
- The third number is the number of points in the feature, in order for drawing. A positive number indicates a polygon, and points are defined in a clockwise direction as you walk around the land boundary, so you are walking on an imaginary beach with your left foot on land and your right foot in the water. A negative number defines a line.

```
"2","1",18
-82.521416,27.278500
-82.552109,27.353674
-82.564636,27.383394
-82.600746,27.500633
-82.576721,27.581442
-82.541473,27.665442
-82.478104,27.725504
-82.443367,27.755222
-82.250000,27.730673
-82.250000,27.685675
-82.250000,27.640678
-82.250000,27.595680
-82.250000,27.505688
-82.250000,27.460690
-82.250000,27.415693
-82.250000,27.370695
-82.351616,27.278500
-82.453232,27.278500
"2","1",10
-82.250000,27.865969
-82.333580,27.864744
-82.383003,27.879385
```

```
-82.479012,27.888107
-82.543144,27.952902
-82.456032,28.066999
-82.405220,28.066999
-82.354408,28.066999
-82.250000,27.977007
-82.250000,27.898989
```

Two special types of polygons are defined for GNOME maps: an map boundary for nonrectangular maps, and a spillable area. These special polygons are most commonly used in location files to help user's avoid making mistakes.

The map bounds defines a polygon with a similar format as above. This polygon should be the first polygon in the map file.

```
"Map Bounds","1",7
-121.319176,35.199476
-121.319176,34.197944
-121.218496,34.0
-119.378944,34.0
-119.221448,34.152428
-119.221448,35.199476
-121.319176,35.199476
```

The spillable area defines a polygon so that the user may not start spills out side the polygon, or over land areas within the polygon. Again, the format is similar to other polygons in the bna format. This polygon should be the last one defined in the map file.

```
"SpillableArea", "1", 15
-121.319176,35.199476
-121.319176,34.197944
-121.218496,34.0
-120.633640,34.0
-120.445584,34.088112
-120.381776,34.085196
-120.204512,34.026884
-120.066248,34.053124
-119.931528,34.061872
-119.729456,34.015220
-119.534464,34.047292
-119.378944,34.0
-119.221448,34.152428
-119.221448,35.199476
-121.319176,35.199476
```

Currents, Finite Element

For more information about file formats from the NOAA CATS hydrodynamic model, see the specific documentation with the application.

Please note that beginning with GNOME 1.3 we added the capability to generate a DAGTree within GNOME, so that portion of the current file is now optional.
File Name *TinyWillapa SAC.CUR*

```
DAG 1.0
Vertices 8
8       8
-124.018048     46.694592       1.000000
-124.044816     46.668488       1.000000
-124.017968     46.650984       1.000000
-123.992400     46.664772       1.000000
-123.964264     46.646212       1.000000
-123.929744     46.673788       1.000000
-123.956592     46.696068       1.000000
-123.991760     46.683868       1.000000
Topology        6
0       1       7       5       -1      -1      0.502367        -0.298270
1       2       3       -1      5       -1      0.000000        -0.000000
3       4       5       -1      4       -1      0.000000        -0.000000
5       6       7       -1      4       -1      0.588724        0.297317
7       3       5       2       3       5       0.978753        0.205045
7       1       3       1       4       0       0.971727        -0.100222
DAGTree         13
32      1       7
31      2       5
30      -8      3
2       4       -8
0       -8      -8
7       6       -8
6       -8      -8
26      8       11
25      -8      9
12      10      -8
13      -8      -8
18      12      -8
19      -8      -8
```

Annotated Version of the File

DAG 1.0
Vertices 8 *Number of Vertices*
8 8 *Number of Vertices, Repeated*

Longitude	*Latitude*	*Depth*
-124.018048	46.694592	1.000000
-124.044816	46.668488	1.000000
-124.017968	46.650984	1.000000
-123.992400	46.664772	1.000000
-123.964264	46.646212	1.000000
-123.929744	46.673788	1.000000
-123.956592	46.696068	1.000000
-123.991760	46.683868	1.000000

Topology 6 *Number of Triangles*

Points in Tri			*Adjacent Tri to Seg*			*Velocity (u,v)*		*Tri #*
0	1	7	5	-1	-1	0.502367	-0.298270	*0*
1	2	3	-1	5	-1	0.000000	-0.000000	*1*
3	4	5	-1	4	-1	0.000000	-0.000000	*2*
5	6	7	-1	4	-1	0.588724	0.297317	*3*
7	3	5	2	3	5	0.978753	0.205045	*4*
7	1	3	1	4	0	0.971727	-0.100222	*5*

DAGTree 13 *Number of Elements in DAGTree*

Seg#	*Branch Left*	*Branch Right*	*DAGTree Branches*
32	1	7	*0*
31	2	5	*1*
30	-8	3	*2*
2	4	-8	*3*
0	-8	-8	*4*
7	6	-8	*5*
6	-8	-8	*6*
26	8	11	*7*
25	-8	9	*8*
12	10	-8	*9*
13	-8	-8	*10*
18	12	-8	*11*
19	-8	-8	*12*

Scaling Current Patterns

Since the current patterns created in GNOME only indicate the direction of the current and the relative speeds, the current patterns need to be scaled in order to be useful with the trajectory model. For example, consider a fictitious current pattern with only two triangles, A and B. The velocity in triangle A is 1.2 to the east and the velocity in triangle B is 1.8 to the north. Observations indicate that the velocity in triangle A should be 3.0 knots to the east, so we must scale the current pattern by the ratio of these velocities in triangle A, or (3.0 knots/1.2 = 2.5 knots). That is, multiplying the velocity in triangle A in the current pattern (1.2) by the scale factor (2.5 knots) yields the observed velocity (3.0 knots). The direction did not change. To find out the velocity in triangle B, we multiply the velocity in triangle B in the current pattern (1.8) by the scale factor (2.5 knots) to get a velocity of 4.5 knots. The velocity in triangle B is still to the north, since the direction does not change in the current pattern.

GNOME is quite helpful in scaling current patterns. At a given reference point in the current pattern, GNOME tells you what the flow is. You then input into GNOME what you would like the velocity to be at the reference point, and GNOME takes care of figuring out the scaling coefficient for the pattern for you!

The direction of the flow in the current fields in GNOME can reverse by multiplying the pattern by a negative scaling coefficient. The ebb and flow of tides are simulated this way, through a time series of positive and negative scaling values. You can scale currents with either a constant value or some sort of time series. The files formats for these time series are outlined below.

Current patterns in GNOME can be scaled to be time dependent with two different file types: a time series of current magnitude or as a "Shio mover" that contains data for GNOME to use in calculating tidal current magnitudes. All data in this section are created by the NOAA Shio application.

The South Bend, WA station on the Willapa River has been chosen for all the examples in this section. Below is the information found in the *SouthBend.text* file to aquaint you with the information GNOME will need in order to calculate the tidal currents at this station. This particular file is not an data file for GNOME. This data is represented in data files suitable for GNOME further on in this discussion.

Tidal currents at South Bend, Willapa River, WASHINGTON COAST
Station No. CP1009
Meter Depth: n/a

Latitude: 46ß0' N
Longitude: 123ß47' W

Maximum Flood Direction: 90ß
Maximum Ebb Direction: 270ß

Time offsets Hour:Min
Min Before Flood 0:19am
Flood 0:20am
Min Before Ebb 0:24am
Ebb -0:06am

Flood Speed Ratio: 0.6
Ebb Speed Ratio: 0.5

	Speed(kt)	Direction(deg.)
Min Before Flood	00.0	n/a
Flood	01.2	090
Min Before Ebb	00.0	n/a
Ebb	01.4	270

Based on Grays Harbor Ent.

Local Standard Time

Mon, Aug 24, 1998 Sunrise -- 6:09am Sunset -- 7:55pm

0:38am	+01.2	Max Flood
3:31am	+00.0	Min Before Ebb
6:29am	-01.6	Max Ebb
9:59am	+00.0	Min Before Flood
1:08pm	+01.4	Max Flood
4:12pm	+00.0	Min Before Ebb
6:56pm	-01.4	Max Ebb
10:17pm	+00.0	Min Before Flood

Time series file for currents have the format

dd,mm,yy,hr,min,|U|,0.0

where *dd* is the day, *mm* is the month, *yy* is the year, *hr* is the hour, *min* is the minute, |*U*| is the magnitude of the velocity, and 0.0 is a number to indicate that the file is in a magnitude format rather and a *u,v* format. The direction if left blank because the current pattern supplies the individual current vectors. For example the *SouthBend.ossm* file contains one day of tidal information for South Bend, Washington.

24, 8, 98, 0, 37, 1.2, 0.0
24, 8, 98, 3, 30, 0.0, 0.0
24, 8, 98, 6, 28, -1.6, 0.0
24, 8, 98, 9, 58, 0.0, 0.0
24, 8, 98, 13, 7, 1.4, 0.0
24, 8, 98, 16, 11, 0.0, 0.0
24, 8, 98, 18, 55, -1.4, 0.0
24, 8, 98, 22, 16, 0.0, 0.0

Annotated Version of the File

Day,	*Month ,*	*Year,*	*Hour ,*	*Min.,*	*Speed*	*Direction(Dummy Value)*
24,	8,	98,	0,	37,	1.2,	0.0
24,	8,	98,	3,	30,	0.0,	0.0
24,	8,	98,	6,	28,	-1.6,	0.0

24,	8,	98,	9,	58, 0.0,	0.0	
24,	8,	98,	13,	7, 1.4,	0.0	
24,	8,	98,	16,	11,	0.0,	0.0
24,	8,	98,	18,	55,	-1.4,	0.0
24,	8,	98,	22,	16,	0.0,	0.0

Below is the South Bend, WA **"SHIO Mover"** for gnome.

Filename: *SouthBend.shio*

[StationInfo]
Type=C
Name=South Bend, Willapa River
Latitude=46.666667
Longitude=-123.800000
[Constituents]
DatumControls.datum=-0.300000
DatumControls.FDir=60
DatumControls.EDir=240
DatumControls.L2Flag=0
DatumControls.HFlag=0
DatumControls.RotFlag=0
H=2.265000 0.592000 0.457000 0.569000 0.154000 0.296000 0.079000 0.000000 0.000000 0.000000
0.089000 0.000000 0.000000 0.061000 0.013000 0.016000 0.000000 0.021000 0.023000 0.000000
0.000000 0.000000 0.000000 0.000000 0.011000 0.058000 0.035000 0.000000 0.000000 0.188000
0.000000 0.000000 0.064000 0.000000 0.161000 0.031000 0.000000 0.000000 0.000000 0.000000
0.000000 0.000000
kPrime=301.799988 324.500000 289.000000 48.200001 57.900002 47.299999 344.500000 0.000000
0.000000 0.000000 290.700012 0.000000 0.000000 276.299988 49.099998 312.299988 0.000000
47.799999 48.599998 0.000000 0.000000 0.000000 0.000000 0.000000 46.900002 46.700001
324.899994 0.000000 0.000000 48.799999 0.000000 0.000000 314.500000 0.000000 323.899994
49.900002 0.000000 0.000000 0.000000 0.000000 0.000000 0.000000
[Offset]
MinBefFloodTime=0.316667 1
FloodTime=0.333333 1
MinBefEbbTime=0.400000 1
EbbTime=-0.100000 1
FloodSpdRatio=0.600000 1
EbbSpdRatio=0.500000 1
MinBFloodSpd=0.000000 1
MinBFloodDir=0.000000 0
MaxFloodSpd=1.200000 1
MaxFloodDir=90.000000 1
MinBEbbSpd=0.000000 1
MinBEbbDir=0.000000 0
MaxEbbSpd=1.400000 1
MaxEbbDir=270.000000 1

Hydrology time series file for currents have the format listed below. The first line is the station name, the second line contains the reference point position for scaling the current pattern with the hydrology volume transport time series. The third line is the units for the volume transport (CFS, KCFS, CMS, KCMS). The data is given in the time series format as the currents, only the magnitude of the current is changed to the volume transport. The name of the file in the supplied data sets is Hillsbourgh.HYD .

```
HILLSBOURGH STATION
28.029534,-82.688080
CMS
01,10,2002,0,0,432,0
02,10,2002,0,0,309,0
03,10,2002,0,0,310,0
04,10,2002,0,0,312,0
05,10,2002,0,0,311,0
06,10,2002,0,0,287,0
07,10,2002,0,0,234,0
08,10,2002,0,0,235,0
09,10,2002,0,0,232,0
10,10,2002,0,0,177,0
```

Annotated Version of the File

```
HILLSBOURGH STATION                    Station Name
28.029534,-82.688080                   Position (latitude, longitude)
CMS                                    Units
Day,  Month , Year,  Hour ,  Min.,  Transport  Direction(Dummy Value
01,   10,     2002,  0,      0,     432,      0
02,   10,     2002,  0,      0,     309,      0
03,   10,     2002,  0,      0,     310,      0
04,   10,     2002,  0,      0,     312,      0
05,   10,     2002,  0,      0,     311,      0
```

Wind - OSSM Timeseries Format

File name *OSSM format.WND*
User will have to specify units when file is loaded into GNOME.

```
8,4,99,01,00,10,S
8,4,99,05,00,10,S
8,4,99,09,00,10,S
8,4,99,11,00,10,S
8,4,99,15,00,10,SW
8,4,99,21,00,10,SW
9,4,99,01,00,10,SW
9,4,99,05,00,10,SW
9,4,99,09,00,10,SW
9,4,99,11,00,10,SW
9,4,99,15,00,10,SW
9,4,99,21,00,10,SW
10,4,99,01,00,10,SW
10,4,99,05,00,05,S
10,4,99,09,00,05,S
10,4,99,11,00,05,S
10,4,99,15,00,05,S
10,4,99,21,00,05,S
11,4,99,01,00,10,SW
11,4,99,05,00,10,SW
11,4,99,09,00,10,SW
11,4,99,11,00,10,W
11,4,99,15,00,10,W
11,4,99,21,00,10,W
12,4,99,01,00,25,NW
12,4,99,05,00,25,NW
12,4,99,09,00,25,NW
12,4,99,11,00,25,NW
12,4,99,15,00,25,NW
12,4,99,21,00,25,NW
```

Annotated Version of the File

Day,	*Month ,*	*Year,*	*Hour ,*	*Min.,*	*Speed,*	*Direction*
8,	4,	99,	01,	00,	0,S	
8,	4,	99,	05,	00,	10,	S
8,	4,	99,	09,	00,	10,	S
8,	4,	99,	11,	00,	10,	S
8,	4,	99,	15,	00,	10,	SW

….

Importing non-CATS current files: GridCur

The file should contain velocity information in the x and y directions on a rectangular grid. The first 8 lines contain header information which define the file type, grid size, and grid location. The remaining lines contain the current data. The keywords are the words in capitals below and must appear exactly. This documentation consists of two example files followed by an explanation of each of the file components. If you would like the try either of these current patterns, you will also need the "GridCur.bna" file.

The first example is "GridCurExA.cur". Position information is given from a starting latitude and longitude and an increment.

NOTE: If you have missing values, you may simply skip those grid points in the data file.

```
[GRIDCUR]
NUMROWS 100
NUMCOLS 100
STARTLAT 33.8
STARTLONG -120.4
DLAT .008
DLONG .01
row col u v
1 1 .10 .10
1 2 .10 .10
1 3 .10 .10
1 4 .10 .10
1 5 .10 .10
1 6 .10 .10
. . .
```

The second example is "GridCurExB.cur". The grid location given by bounding latitudes and longitudes.

```
[GRIDCUR]
NUMROWS 100
NUMCOLS 100
LOLAT 33.4
HILAT 35
LOLONG -120.4
HILONG -119
row col u v
1 1 .10 .10
1 2 .10 .10
```

```
1 3 .10 .10
1 4 .10 .10
1 5 .10 .10
1 6 .10 .10
1 7 .10 .10
. . .
```

Both files are explained below.

The first line is a flag identifying the file as an outside current file
[GRIDCUR]

The next two lines specify the grid size by number of rows and number of columns
NUMROWS nrows
NUMCOLS ncols

Lines 4 through 7 give the grid bounds and can either be specified by low and high latitude and longitude ranges as follows
LOLAT lolat
HILAT hilat
LOLONG lolong
HILONG hilong

or by the latitude and longitude of the grid origin (assumed to be the lower left corner) and the increment size
STARTLAT lat
STARTLONG long
DLAT dlat
DLONG dlong

In the former case the velocities are assumed to be in the center of grid rectangles and in the latter case the velocities are assumed to be given at the grid points.

Line 8 is designed to be a header identifying the columns of data. It is read, but not used.
row col u v

This header information is followed by NROWS * NCOLS lines of current data. Each line consists of 4 elements corresponding to the items in Line 8. These are the point's location in the grid given by a row and column, and its velocity components in the x and y directions assumed to be in meters/second. The file must contain a line for each of the NROWS * NCOLS grid points.

Importing non-CATS current files: GridCur Time Series

GNOME allows rectangular grid models a simple file format similar to the single current pattern description above. The header now indicates that time has been added [GRIDCURTIME] and the time of the first time step has been added in the [TIME] line. The file “gridcurTime.cur” has been included as an example.

NOTE: As is the regular GridCur data format, if you have missing values, you may simply skip those grid points in the data file.

```
[GRIDCURTIME]
NUMROWS 100
NUMCOLS 100
LOLAT 34.0
HILAT 34.4
LOLONG -120.8
HILONG -119.2
[TIME] 14 2 00 10 00    - day  month  year hour minute
1 1 .10 .10
1 2 .10 .10
1 3 .10 .10
1 4 .10 .10
```

Each succeeding timestep is simply appended onto the bottom

```
100 97 .10 .10
100 98 .10 .10
100 99 .10 .10
100 100 .10 .10
[TIME] 14 2 00 11 00     next timestep information
1 1 .20 .20
1 2 .20 .20
1 3 .20 .20
1 4 .20 .20
1 5 .20 .20
1 6 .20 .20
```

GNOME Output File Formats

MOSS Files for GIS Systems

GNOME outputs moss files 3 through 7.

File 3: Header information such as scenario information and any caveats.
File 4: Positions for Best Guess (Forecast) LEs
File 5: Attributes of each of the LEs in File 4
File 6: Same as File 4 for the Minimum Regret (Uncertainty) LEs
File 7: Same as File 5 for the Minimum Regret (Uncertainty) LEs

The file formats are documented extensively in HAZMAT Report 96-4 "Digital Distribution Standard for NOAA trajectory Analysis Information", January 1996, J. A. Galt, D. L. Paton, H. Norris and C. Friel.

GNOME and GNOME Analyst Custom Logo on Output

Both GNOME and GNOME Analyst can have a custom logo added to the output products. If no custom logo is given, MOSS files will have the GNOME logo and GNOME Analyst output will only have the GNOME logo on the upper right (custom logo added to the upper left corner).

Brief instructions follow:

1. Create a bitmap called "logo.bmp" that contains the desired graphic

2. Place "logo.bmp" into the application folder.
   If you are writing MOSS files, then "logo.bmp" is written into the .MS3 file and "logo.bmp" is copied into the directory where the .MS* files are being saved. ArcView uses a 150 x 150 pixels file.
   If you are working with GNOME Analyst, the file "logo.bmp" will be used to draw the logo on the upper left of the output materials (printed page, bitmap). GNOME Analyst uses a 48 x 48 pixel file.